



Fresh Fruit Trade Among the North American Free Trade Agreement Countries

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I. Introduction

In the last three decades, the U.S. imports of fresh fruits have been increasing constantly at an annual average growth rate of 7% (United Nations database, 2016). This increase has been accompanied with continuous changes in the imports mix. Currently, the fresh fruits make up 9% of the total U.S. food imports (United Nations database, 2016). The top eight fresh fruits imported to the U.S. in 2015 accounted for 62% of total fruits trade value (United Nations database, 2016) with the NAFTA countries emerging as important trade partners. This study analyzes the U.S. demand of fresh apples, avocados, berries, and grapes imported from Mexico, Canada and the rest of the world (ROW).

II. Research Objectives

The study is aimed at:

- Estimating the U.S. demand for the selected fresh fruit types coming from three different import sources;
- Estimating own-price, cross-price, and expenditure elasticities of demand for the selected fruit types;
- Investigating whether the source of origin is an intrinsic quality attribute for the selected types of fruits.

III. Model

The following Source-Differentiated Non-Linear Almost Ideal Demand System model was estimated:

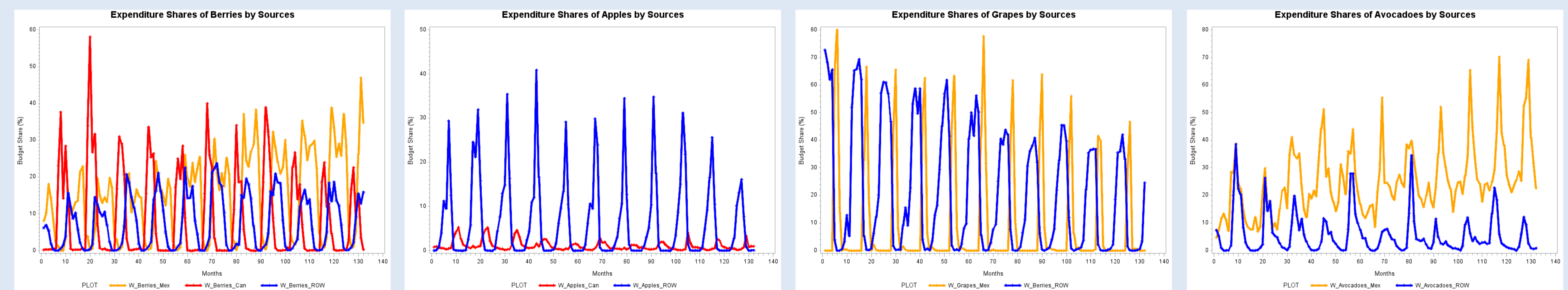
$$w_{ic} = \alpha_{ic} + \sum_j \sum_k \gamma_{icjk} \log(p_{jk}) + \beta_{ic} \log \frac{X}{P} + \varepsilon_{ic},$$

where:

- i and j indicate goods; c and k indicate source of origin,
- w_{ic} is the import expenditure share for good i from source c ,
- p_{jk} is the price of good j from source k ,
- X is the U.S. expenditure on all goods included in the model,
- α_{ic} , γ_{icjk} , and β_{ic} are the parameters to be estimated;
- P is the nonlinear price index, and
- ε_{ic} is the stochastic disturbance term.

IV. Data

The total expenditure and net weight data on the U.S. monthly imports of fresh fruits (berries, apples, grapes, and avocados) by country for the period of 2005 through 2015 were obtained from the official database of United States International Trade Commission (USITC). The different types of the selected fruits were combined into one category and their weighted average price was used for further analysis.



V. Estimation Results

Table 1. The Compensated Cross-Price Elasticities and Uncompensated Own-Price and Expenditure Elasticities

| | Berries Mexico | Berries Canada | Berries ROW | Apples Canada | Apples ROW | Grapes Mexico | Grapes ROW | Avocados Mexico | Avocados ROW | Expenditure |
|-----------------|----------------|----------------|-------------|---------------|------------|---------------|------------|-----------------|--------------|-------------|
| Berries Mexico | -0.939* | -0.138* | 0.018 | 0.024* | -0.432* | 0.257* | 0.176 | 0.588* | 0.241* | 1.399* |
| Berries Canada | -0.235* | -0.924* | 0.247* | -0.036* | 0.355* | -0.163 | 0.189 | 0.364* | 0.193 | 0.097 |
| Berries ROW | 0.036 | 0.291* | -0.727* | 0.092* | 0.173* | 0.175* | 0.225* | -0.244 | -0.121 | 1.356* |
| Apples Canada | 0.324* | -0.281* | 0.611* | -0.911* | 0.152 | -0.046 | 0.121 | 0.252 | -0.223 | 0.03 |
| Apples ROW | 0.215 | 0.474* | 0.197* | 0.026 | -0.523* | 0.243 | 0.044 | 0.267 | 0.197 | 0.885* |
| Grapes Mexico | 0.391* | -0.146 | 0.133* | -0.005 | 0.162 | -0.054 | -0.401 | 0.254 | -0.565* | 2.386* |
| Grapes ROW | 0.123 | 0.078 | 0.079* | 0.006 | 0.014 | -0.185 | -0.768* | 0.284* | 0.266* | 0.489* |
| Avocados Mexico | 0.34* | 0.124* | -0.07 | 0.011 | 0.068 | 0.097 | 0.233* | -1.032* | -0.049 | 1.098* |
| Avocados ROW | 0.625* | 0.295 | -0.156 | -0.043 | 0.225 | -0.964* | 0.983* | -0.222 | -0.758* | 0.282 |

1.* indicates statistical significance at the 0.05 level.

2. The highlighted entries are the own-price elasticities.

VI. Conclusions

- All the statistically significant uncompensated own-price elasticities are inelastic except for the own-price elasticity of avocados imported from Mexico.
- Most of the statistically significant cross-price elasticities have positive sign indicating that the fruits imported from given sources are net substitutes.
- All the expenditure elasticities are positive implying that the quantity demanded of all fruit types increased as real expenditure for those fruits rose with all other factors held constant.

VII. References

1. Deaton, A. and J. Muellbauer. "An Almost Ideal Demand System." *American Economic Review*, 1980, 70:312-326.
2. Henneberry, S.R. and J.E. Mutondo. "Agricultural Trade among NAFTA Countries: A Case Study of U.S. Meat Exports." *Applied Economic Perspectives and Policy*, 2009, 31:424-445.